

National Aeronautics and Space Administration



A New Space Enterprise of Exploration

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Exploration of Near Earth Objects
Objectives Workshop

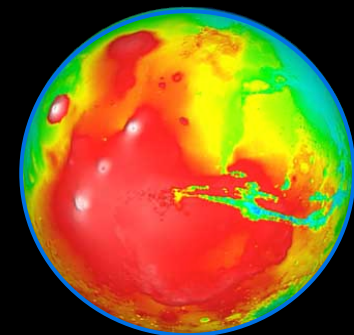
10 August 2010



ESMD: Blazing a Trail Into the Solar System



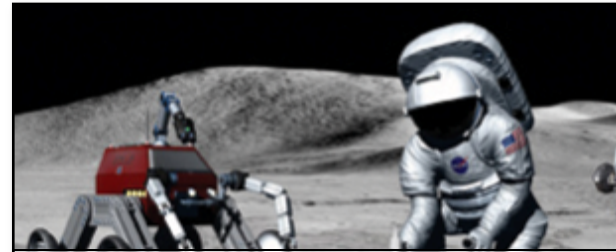
- NASA's human spaceflight program seeks to extend human presence throughout the solar system
- The President's FY2011 budget request takes a new approach to this goal, focusing on capabilities that will allow us to reach multiple destinations, including the moon, asteroids, and Mars and its moons
- The investments seek to create the new *knowledge* and *capabilities* required for humans to venture beyond low-Earth orbit (LEO) to stay
- Approach expands alternatives available for human exploration, currently limited by lack of strategic investment in technology development over past decades



Human Space Exploration Themes Remain the Same



**A Sustained Presence -
Extending Human Frontiers**



**New Knowledge in Science and
Technology**



Economic Expansion



Global Partnerships



Inspiration and Education

What is the Destination?



- **The future human spaceflight program will build through a steady sequence of achievements, from a set of crewed flights to test and prove systems required for exploration beyond LEO orbit early in the next decade, to a near-Earth object mission in 2025, to missions to Mars' environs by mid-2030s, followed by landing on Mars**
- **This approach builds experience and capability through time, results in successive “firsts” (much like the Mercury and Gemini approach) and allows the human spaceflight systems to be developed serially rather than concurrently, making the endeavor affordable to the tax payer**
- **Although we cannot provide a date with certainty for the first human landing on Mars, we can identify essential capabilities needed for such a mission. These are reflected in the programs within this budget request.**
 - They are capabilities that have been recommended consistently for more than two decades in national level reports of committees and commissions addressing future human space exploration
 - They are the near-term steps NASA must take to create the new knowledge and capabilities required for humans to venture beyond LEO to stay

The New Path for Human Space Exploration



- **The FY2011 budget request challenges NASA to embark on a new human space exploration program that is sustainable and affordable**
- **The budget balances investments in future human spaceflight systems with obtaining key knowledge about future destinations and demonstrating critical enabling technologies for human spaceflight and exploration, including:**
 - Research and development of heavy-lift and propulsion engines and other key technologies
 - Technology development and demonstrations to reduce cost and prove required capabilities for future human exploration
 - Exploration precursor robotic missions to multiple destinations to cost-effectively scout human exploration targets and identify hazards and resources for future human exploration
 - Increased investment in human research to prepare for long journeys beyond Earth
 - Expanded efforts to develop U.S. commercial human spaceflight capabilities, making space travel more accessible and affordable

Phased Development Strategy



2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026

Phase I Build the Foundation

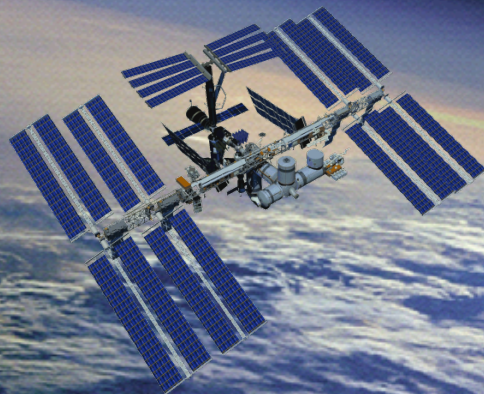
Commercial Sector,
Robotic Precursors, and Game-
Changing Technology Development

Phase II Systems Development

Design and Development of Heavy-Lift and
In-space capabilities

Phase III Sustainable Exploration of the Solar System

Human Exploration
Missions to Solar
System Destinations



ESMD Planned Programs and Projects

30 June 2010



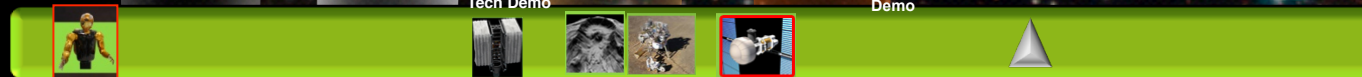
Research & Technology Development
Flight Demonstrations
LEO Access

by Fiscal Year 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020

Human Research



Enabling Technology Development



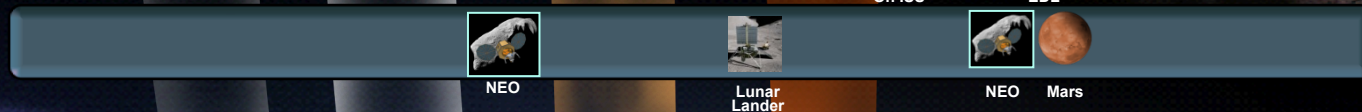
Heavy Lift/ Propulsion Technology



Flagship Technology Demonstrations



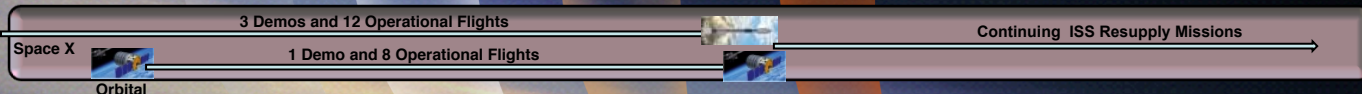
Exploration Precursor Robotic Program



Exploration Scout Missions



Commercial Cargo



Commercial Crew



RED OUTLINE DESIGNATES
USE OF ISS

Supports Initiation of
Systems in 2015 Timeframe
For Human Exploration
Beyond Low Earth Orbit

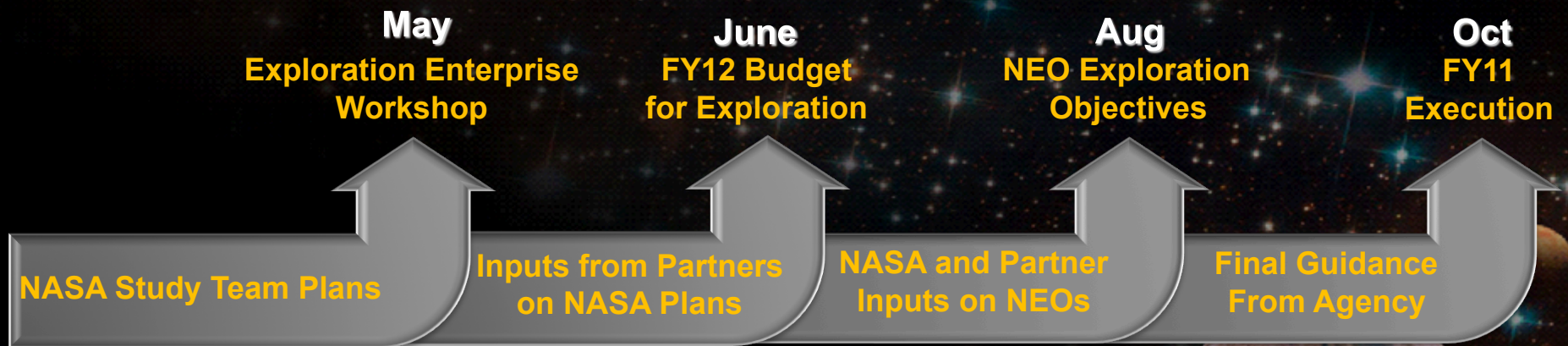
Where We are Today



	Instrument	Release	Response	Award	# Responses
Heavy Lift and Propulsion Technology (HLPT)	RFI	4 May	21 May	N/A	46
Enabling Technology Development and Demonstration (ETDD)	RFI	7 May	4 Jun	N/A	112
Flagship Technology Demonstrations (FTD)	RFI	17 May	11 Jun	N/A	195
Exploration Precursor Robotic Missions (xPRM)	RFI	21 May	11 Jun	N/A	130
Commercial Crew (CC)	RFI	21 May	18 Jun	N/A	32
					515

- As part of the Exploration Enterprise Workshop in Galveston, Texas May 25-26, 2010, received much feedback from partners in industry and academia
- The Exploration Systems Mission Directorate (ESMD) has been incorporating input into development plans
- This conference is next major engagement with public to continue the dialog

Where We Go Next



- ESMD ready to proceed with new exploration enterprise
- While leadership works towards consensus on exploration strategy, will continue to refine plans and keep options open
- Now is the best opportunity to develop requirements and CONOPS for future missions

ESMD: Blazing a Trail Into the Solar System



- Extending human presence throughout the solar system
- Focusing on capabilities that will allow us to reach multiple destinations
- The investments seek to create the new *knowledge and capabilities*
- Approach expands alternatives available for human exploration



www.nasa.gov/exploration